What is claimed is:

1. A system for the management of thermal transfer in a gas turbine engine, said system comprising:

a heat generating sub-system disposed in operable communication with said engine;

a fuel source configured to supply a fuel;

a fuel stabilization unit configured to receive said fuel from said fuel source and to provide said fuel to said engine; and

a heat exchanger disposed in thermal communication with said fuel to effect the transfer of heat from said heat generating sub-system to said fuel.

2. The system of claim 1, wherein said fuel stabilization unit is upstream of said heat generating sub-system.

3. The system of claim 1, wherein said fuel stabilization unit is downstream of said heat generating sub-system.

4. The system of claim 1, further comprising a pre-heater to heat said fuel before said fuel is received into said fuel stabilization unit.

5. The system of claim 1, wherein said fuel supplied to said engine is at a temperature of greater than about 325 degrees F.

6. The system of claim 1, wherein said fuel supplied to said engine is at a temperature of about 550 degrees F to about 900 degrees F.

7. The system of claim 1, wherein said fuel supplied to said engine is at a temperature of about 700 degrees F to about 800 degrees F.

8. The system of claim 1, wherein said fuel stabilization unit comprises,

a flow plate having channels disposed in a planar structure thereof, said channels being configured to accommodate a flow of said fuel, and

a membrane disposed in interfacial engagement with said flow plate, said membrane configured to receive a flow of oxygen drawn from said fuel therethrough.

9. The system of claim 1, wherein said heat generating sub-system is selected from the group of heat generating sub-systems consisting of a high temperature oil system, a cooled turbine cooling air unit, a turbine exhaust recuperator, a fuel-cooled exhaust nozzle, a fuel-cooled engine case, and combinations of the foregoing heat generating sub-systems.

10. The system of claim 9, wherein said high temperature oil system comprises a heat exchanger configured to receive an oil stream from a bearing and/or gearing arrangement and said fuel from said fuel stabilization unit, said heat exchanger being configured to effect the transfer of heat from said oil stream to said fuel.

11. The system of claim 9, wherein said cooled turbine cooling air unit comprises a heat exchanger configured to receive an air stream from said aircraft engine and said fuel from said fuel stabilization unit, said heat exchanger being configured to effect the transfer of heat from said air stream to said fuel.

12. The system of claim 9, wherein said turbine exhaust recuperator comprises heat exchanger configured to receive an air stream exhausted from a turbine of said aircraft engine and said fuel from said fuel stabilization unit, said heat exchanger being configured to effect the transfer of heat from said air stream exhausted from said turbine to said fuel.

13. The system of claim 1, further comprising a selectively-actuatable fuel bypass disposed around said heat generating sub-system, said selectively-actuatable fuel bypass being configured to effect the bypass of fuel around said heat generating sub-system.

14. The system of claim 1, wherein said gas turbine engine is incorporated into an aircraft.

15. A system for the management of heat transfer, said system comprising:

an energy conversion device; and

a fuel system configured to supply a fuel to said energy conversion device, said fuel being substantially coke-free, said fuel system comprising at least one heat generating sub-system disposed in thermal communication with said fuel from said fuel system to effect the transfer of heat from said heat generating sub-system to said fuel;

wherein said fuel is heated to a temperature of greater than about 550 degrees F.

16. The system of claim 15, wherein said fuel is heated to a temperature of about 550 degrees F to about 900 degrees F.

17. The system of claim 15, wherein said fuel is heated to a temperature of about 700 degrees F to about 800 degrees F.

18. The system of claim 15, wherein said energy conversion device is a gas turbine engine.

19. The system of claim 15, wherein said fuel system further comprises a fuel stabilization unit to deoxygenate said fuel.

20. The system of claim 19, wherein said fuel stabilization unit comprises,

a flow plate having channels disposed in a planar structure thereof, said channels being configured to accommodate a flow of said fuel, and

a membrane disposed in interfacial engagement with said flow plate, said membrane being configured to receive a flow of oxygen drawn from said fuel therethrough.

21. The system of claim 20, further comprising baffles disposed in said channels to facilitate the mixing of fuel in said flow plate.

22. The system of claim 21, wherein said mixing of fuel is effected in a turbulent flow regime.

23. The system of claim 21, wherein said mixing of fuel is effected in a laminar flow regime.

24. The system of claim 20, wherein said membrane comprises a fluoropolymer coating disposed on a porous backing.

25. The system of claim 20, further comprising a porous substrate disposed in interfacial engagement with said membrane.

26. The system of claim 15, wherein said at least one heat generating sub-system is selected from the group of heat generating sub-systems consisting of a fuel-cooled environmental control system precooler, a cooled turbine cooling air unit, a turbine exhaust recuperator, a heat pump, a fuel-cooled exhaust nozzle, a fuel-cooled engine case, and combinations of the foregoing heat generating sub-systems.

27. The system of claim 15, wherein said fuel system further comprises a vessel in which said fuel is stored, said stored fuel being configured to receive heat from at least one heat generating sub-system.

28. The system of claim 15, wherein said thermal communication between said at least one heat generating sub-system and said fuel is effected using a heat exchanger.

29. The system of claim 15, further comprising a selectively-actuatable fuel bypass disposed around said heat generating sub-system, said selectively-actuatable fuel bypass being configured to effect the bypass of fuel around said heat generating sub-system.

30. A method of managing thermal transfer in an aircraft, said method comprising:

removing oxygen from a stream of a fuel fed to an engine used to drive said aircraft;

transferring heat from a heat generating sub-system of said aircraft to said fuel; and

combusting said fuel.

31. The method of claim 30, wherein said removing oxygen from said stream of said fuel comprises,

directing said fuel to a surface of a permeable membrane,

applying a vacuum across said permeable membrane to create a partial pressure differential, and

causing diffused oxygen dissolved within said fuel to migrate through said permeable membrane.

32. The method of claim 30, wherein said transferring of heat comprises,

receiving a compressed air stream from a compressor of said engine into a heat exchanger, and

receiving said fuel into said heat exchanger such that heat is transferred from said compressed air stream to said fuel.

33. The method of claim 32, further comprising directing said compressed air stream from said heat exchanger to a cabin of said aircraft.

34. The method of claim 32, further comprising directing said compressed air stream from said heat exchanger to a turbine of said engine.

35. The method of claim 30, wherein said transferring of heat comprises,

receiving an air stream from a turbine of said engine into a heat exchanger, and

receiving said fuel into said heat exchanger such that heat is transferred from said air stream from said turbine to said fuel.

36. The method of claim 30, wherein said transferring of heat comprises,

receiving a high temperature oil stream from a high temperature oil system into a heat exchanger, and

receiving said fuel into said heat exchanger such that heat is transferred from said high temperature oil system to said fuel.

37. The method of claim 36, wherein said high temperature oil stream is a bearing and/or gearing arrangement.

38. The method of claim 30, wherein said combusting said fuel comprises,

heating said fuel to at least about 550 degrees F,

injecting said heated fuel into said engine through a fuel injection nozzle, and

igniting said heated fuel.

39. The method of claim 30, wherein said combusting said fuel comprises,

heating said fuel to about 550 degrees F to about 900 degrees F,

injecting said heated fuel into said engine through a fuel injection nozzle, and

igniting said heated fuel.

40. The method of claim 30, wherein said combusting said fuel comprises,

heating said fuel to about 700 degrees F to about 800 degrees F,

injecting said heated fuel into said engine through a fuel injection nozzle, and

igniting said heated fuel.

41. The method of claim 30, further comprising pre-heating said stream of fuel prior to said removing oxygen from said stream of fuel.

42. A system for the thermal management of an aircraft, said system comprising:

means for powering said aircraft;

means for supplying a fuel to said means for powering said aircraft;

means for deoxygenating said fuel; and

means for effecting the transfer of heat between a heat generating sub-system of said aircraft and said fuel.

43. The system of claim 42, wherein said means for effecting the transfer of heat comprises a heat exchanger.

44. The system of claim 42, wherein said heat generating sub-system is selected from the group of heat generating sub-systems consisting of a fuel-cooled environmental control system precooler, a high temperature oil system, a cooled turbine cooling air unit, a turbine exhaust recuperator, a heat pump, and combinations of the foregoing heat generating sub-systems.

45. A system for the management of thermal transfer in an aircraft, said system comprising:

an aircraft engine;

a heat generating sub-system disposed in operable communication with said aircraft engine;

a fuel source configured to supply a fuel;

a fuel stabilization unit configured to receive said fuel from said fuel source and to provide an effluent fuel stream to said aircraft engine; and

a heat exchanger disposed in thermal communication with said effluent fuel stream from said fuel stabilization unit and said heat generating sub-system to effect the transfer of heat from said heat generating sub-system to said effluent fuel stream.

46. The system of claim 45, wherein said heat generating sub-system is selected from the group of heat generating sub-systems consisting of a fuel-cooled environmental control system precooler, a high temperature oil system, a cooled turbine cooling air unit, an integrated air cycle environmental control system, a turbine exhaust recuperator, a heat pump, and combinations of the foregoing heat generating sub-systems.

47. The system of claim 46, wherein said fuel-cooled environmental control system precooler comprises a heat exchanger configured to receive an air stream from

said aircraft engine and said fuel from said fuel stabilization unit, said heat exchanger being configured to effect the transfer of heat from said air stream to said fuel.

48. The system of claim 46, wherein said heat pump is configured to transfer heat from a low temperature source to said fuel from said fuel stabilization unit.

49. The system of claim 45, further comprising a pre-heater configured to heat said fuel supplied to said fuel stabilization unit.